

REMARKS

Applicants thank the Examiner for the thorough examination of the application. A Declaration is appended to this paper. No new matter is believed to be added to the application by this Response.

Entry Of Response

Entry of this Response under 37 C.F.R. §1.116 is respectfully requested because it places the application in condition for allowance. Alternately, entry is requested as reducing issues for appeal.

Status Of the Claims

Claims 2-23 are pending in the application. Claims 5, 6, 9-11, 20 and 21 have been withdrawn from consideration by the Examiner.

Specification And Enablement

The Examiner objects to the specification as being unclear. The Examiner then rejects claims 2-4, 7, 8, 13-19, 22 and 23 under 35 U.S.C. 112, first paragraph as failing to comply with the enablement requirement. Applicants traverse.

In paragraph 3 of the Office Action, the Examiner makes the following queries (which are set forth below with their replies):

A. “What are chemical processes that are taking place in preparing a ‘sulfur capturing liquid’? What is left in this liquid after all precipitates are removed?”

The sulfur capturing liquid contains silver compounds that precipitate sulfur compounds. What is left in the liquid afterwards are residual silver compounds.

B. “How does X-ray fluorescence participate in precipitating silver or sulfur compounds? Why the liquid should be irradiated for the precipitate to be formed?”

X-ray fluorescence is the analysis method for the concentration of sulfur in the petroleum sample. X-ray irradiation precipitates sulfur.

C. How does the ‘sulfur capturing liquid’ ‘capture’ all sulfur (organic, inorganic, elemental) in the analyte oil sample? What are chemical processes behind such capture?”

The chemical process is the formation of a silver sulfide compound that precipitates.

D. “What is ‘downward’ and ‘upward’ X-ray irradiation of the solution . . . ?”

“Downward” and “upward” refer to the placement of the radiation source, as is shown in Figure 3.

E. “How is it known that the method for capturing sulfur in the analyte oil sample is quantitative, i.e. that in fact all sulfur in the oil sample is captured by the method of the invention?”

This is shown in Figure 6 and Table 2.

The above points will be further discussed below and in the attached Declaration.

In paragraph 4 of the Office Action, the Examiner then rejects claims 2-4, 7, 8, 13-19, 22 and 23 as not being enabled. In order to better explain the enablement of the rejected claims, please find attached a Declaration Under 37 C.F.R. §1.132 to which an excerpt and translation of the Handbook of Petroleum is attached as evidence.

In the attached Declaration, Dr. Hisayuki Kohno makes the following observations:

(i) A skilled inventor can practice the present invention according to the disclosure without undue experimentation. The corresponding Japanese application has already been granted (Japanese Patent No. 3695651) without enablement being brought into question. Although the Examiner has raised questions about the English translation, there are no substantive differences between the United States Application and the corresponding Japanese application in disclosing the invention.

(ii) As evidence that the invention can be practiced by one of ordinary skill without undue experimentation, please find attached the *Handbook Of Petroleum*, pages 145-147 and 151-152, with the corresponding English translation¹. The description in the attached Handbook Of Petroleum was made by the present inventors when they were employees of Rigaku.

¹ Note that the description: "This technique is patented under a Rigaku patent" on page 146 of the Handbook really means that a patent application has already been filed. Also, the caption "Cat" on page 146 stands for "catalyst."

In this technology, sulfur compounds contained in petroleum as impurities (page 145 of the *Handbook Of Petroleum*) are decomposed by x-ray radiation to be captured by sulfur-capturing liquid of the present invention (pages 146 and 147 of the *Handbook Of Petroleum*). This technology described in the *Handbook Of Petroleum* is substantially the same as that described in the specification.

As disclosed in the specification of the present invention, sulfur components contained in petroleum are changed to silver sulfide compounds and analyzed using fluorescent x-rays. The decomposition of sulfur compounds is performed using x-ray radiation. Fluorescent x-rays do not play a role in the decomposition reaction. Therefore, the main chemical reaction in the process of the present invention is that sulfur components decomposed by x-ray radiation react with silver nitrate contained in the sulfur capturing liquid to produce the precipitates of silver sulfide compounds.

When the capturing liquid of the present invention is prepared, the precipitate generated from impurities contained in raw reagents and the small amount of accidentally generated silver acetate precipitates are removed from the prepared solution. Since such precipitates are present in small amounts, silver nitrate remains in large part in the solution. As a result, the silver nitrate can capture the sulfur components contained in petroleum.

Also, the embodiments of the upward or downward irradiation are shown in Figure 3 of the present application. Either the upward or downward irradiation configuration may be used in the present invention. A comparison of the upward and downward irradiation is described at

page 151 of the *Handbook Of Petroleum*. The results show that either upward or downward irradiation can be used (Note that the term “downward irradiation” is expressed as “top irradiation” and the term “upward irradiation” is expressed by “bottom irradiation” in the English translation of the *Handbook Of Petroleum*. However, the meanings are the same.).

Further, the method for capturing sulfur of the present invention is quantitative, as is shown in Figure 6 of the application and in Table 2 of the specification.

As a result, the specification is clear and the invention is sufficiently enabled so it may be practiced without undue experimentation. This rejection is overcome and withdrawal thereof is respectfully requested.

Information Disclosure Statement

The Examiner is thanked for considering the Information Disclosure Statement filed March 24, 2005, and for making the initialed PTO-1449 form of record in the application in the Office Action mailed July 11, 2005.

The Drawings

The Examiner has accepted the drawings in the Office Action mailed February 7, 2006.

Prior Art

The prior art cited but not utilized by the Examiner indicates the status of the conventional art that the invention supersedes. Additional remarks are accordingly not necessary.

Foreign Priority

The Examiner has acknowledged foreign priority and indicated that the certified copies of the priority documents have been received in the Office Action mailed July 11, 2005.

Conclusion

The Examiner's rejections have been overcome, obviated or rendered moot. No issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No.42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of \$450.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any


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additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Dated: July 7, 2006

Respectfully submitted,

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Enclosure: Declaration and Attachments